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Final Report--Objective E, Task 2

December 1987

EXPERIMENTAL PROTOCOL FOR HEMOLYSIS: CONFIRMATION EXPERIMENT

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ABSTRACT

An experiment was conducted by the Mind Science Foundation to study the possible relationship between intent to remotely influence a biological system and actual changes in the system. Three phases of the investigation were conducted, including a pilot study, an intermediate study, and a confirmation study. The first two were used to test and refine the protocol for the third and final study. As a result of these preliminary studies and further input from various experts, the confirmation study appears to have been extremely well conducted.

Thirty-two subjects participated in the confirmation study. Their task was to attempt to retard the rate of hemolysis (destruction) of red blood cells which had been placed into a tube of distilled water and saline in a distant room. Each subject participated for one hour, broken into four 15-minute periods. Of these four periods, two were identified as control periods and two as protect periods. The experimenter who was measuring the rate of hemolysis was blind to this condition. During the protect periods, subjects used visualization and other intention strategies to try to protect the blood cells. During the control periods, subjects were to try to think of other matters. In one control and one protect period, eight tubes of blood were processed, and in the other periods two tubes were processed. Subjects were blind to this condition. It was used to attempt to ascertain whether observed effects could be attributed to causal relationships, or to intuitive data sorting. To see whether or not blood source was important, 14 of the subjects were trying to protect their own blood, and 18 were trying to protect that of another. Both subject and experimenter were blind as to the source of blood.

Results showed that nine of the 32 subjects were able to achieve a significant difference in the rate of hemolysis for the protect periods versus the control periods. The probability of such an extreme result by chance alone is 1.9×10^{-5}. There was no significant difference between those trying to protect their own blood and those trying to protect that of another.

The study was designed to try to determine whether causal forces or intuitive data sorting were responsible for any observed psi results. The extreme heterogeneity in the data made it impossible to make that determination. It is recommended that future studies of this type be designed in such a way that data from each subject can be analyzed separately. It appears that level of psychic functioning, whatever the underlying mechanism, is highly individualized, making it difficult to test a specific theory using data combined across subjects.

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I INTRODUCTION

A. Background

For several years, the Mind Science Foundation (MSF) in San Antonio, Texas, has been investigating the relationship between intent to influence biological systems remotely, and actual changes in the systems. Until recently, it was assumed that any changes observed (beyond chance) were actually *caused* by the subject through a form of remote action (RA). In 1985, a new theory was proposed,[1]* called Intuitive Data Sorting (IDS), which could account for much of the data previously attributed to RA. One postulate of the IDS theory is that observed changes are a result of psi-mediated sorting of the data into experimental and control conditions, and are not the result of a causal remote action.

In FY 1986, SRI International (SRI) awarded a subcontract to MSF to study the distant influence of one individual on the electrodermal activity of another. One of the purposes of the study was to differentiate between results due to RA and those due to IDS. Unfortunately, the experimental protocol allowed for IDS effects to enter the data under the condition that was supposed to isolate RA. Thus, although significant psi effects were observed, it was impossible to determine their source.[2]

In FY 1987, MSF was given a new one-year contract to investigate the relationship between intent to remotely influence the rate of hemolysis of human red blood cells and actual rate of hemolysis. A successful preliminary experiment of this type had been reported in 1979,[3] but that study involved only a small number of trials with one subject who had previously demonstrated apparent psi ability. In contrast, the present investigation included 32 subjects. As part of the new experiment, a condition was built in to provide some information about whether RA or IDS could account for any observed psi results.

A report by William Braud of MSF is attached as the Appendix. It gives a detailed account of the investigation for FY 1987, except for an analysis of whether RA or IDS is more likely to have been the source of any observed psi. The balance of this report contains that analysis, as well as a summary of the entire investigation.

* References may be found at the end of this report.

B. Overview

There were three phases to this investigation. The first phase was a pilot study, conducted to determine how well the proposed methodology would work, and to ascertain whether or not it was important to have a subject trying to influence his or her own blood instead of that of another person. The purpose of the second (intermediate) phase was to construct the parameters necessary to test RA versus IDS. It consisted of a salinity study designed to mimic the anticipated psi–induced changes and a Monte Carlo study, which used the salinity study results to determine the appropriate parameters. The data from the salinity study were also used at SRI to simulate what experimental results might occur in a study where RA was operating. The final phase was the confirmation study. Changes indicated by the results of the first two phases were incorporated into the methodology, as were suggestions from members of the Scientific Oversight Committee (SOC). A site visit by SRI personnel resulted in further minor changes. The resulting protocol for the confirmation study appears to have been extremely sound.

II METHOD OF APPROACH

A. Methodology

A complete description of the methodology for all three phases of the investigation is given in the report by Braud (see Appendix). Because the main purpose of the first two phases was to establish the final protocol for the confirmation study, those details are omitted from this report. The methodology for the confirmation study can be summarized as follows.

Thirty-two subjects participated in one experimental session each. A session consisted of four consecutive 15-minute periods. Two of these were designated as control (C) periods, and the other two as protect (P) periods. During the P periods, each subject was encouraged to "heal" the blood (i.e., retard the hemolysis rate). During the C periods the subject was instructed to think of other matters. Half of the subjects followed a pattern of PCCP, while the remaining half followed the pattern CPPC. One of the P periods and one of the C periods for each subject was designated as a two-trial period, and the other was designated as an eight-trial period (a trial is defined below). This distinction was necessary to try to differentiate between RA and IDS effects. The subject was blind to the number of trials in the period, and the experimenter was blind to the pattern of P and C periods. All of these assignments were prepared by another staff member at MSF before the experiment began by consulting a random number table.

Blood samples were collected from each subject 14 to 42 hours prior to the experimental session, and stored at 4°Celsius. The registered nurse who drew the blood was supposed to label half of the samples with the name of the actual donor, and the other half with the name of one of the other donors. Because of a scheduling change and resulting confusion, 14 samples were labeled with the donors' own names, while 18 were labeled with the names of others. Thus, during the protect periods, 14 subjects were trying to protect their own blood and 18 subjects were trying to protect the blood of another. Both the experimenter and the subject were blind to the source of the blood until after all 32 sessions were completed.

To begin the experimental session, the subject and the experimenter were isolated in rooms in different parts of the building. During each of the four 15-minute periods, the experimenter sequentially conducted either two or eight trials, based on the preassigned scheme.

For each trial, a fixed amount (100 μl) of whole blood was added to a prepared tube of 0.425% saline in 6.0 ml of distilled water. Saline solution causes red blood cells to deteriorate through the liberation of the hemoglobin contained in them. This process is called hemolysis. The purpose of this study was to see if psi could be used to slow down the rate of hemolysis.

To measure the rate of hemolysis for each trial, the experimenter placed the tube in a spectrophotometer which recorded the percent light transmittance for each of 60 seconds. The data used for analysis was the difference between the average for the first five seconds and the average for the last five seconds. If the subject was successfully protecting the blood, the difference should be smaller during the protect periods than during the control periods, because red blood cells retaining more hemoglobin should transmit less light. Using this procedure, either two or eight tubes were consecutively processed in each period. Strict measures, described in the appended MSF report, were used to ensure that the timing was consistent over all sessions.

Meanwhile, the subject was signaled at the beginning of each of the 15-minute periods, but did not know whether data for two or eight trials (tubes) were being collected in that period. The subject consulted the preassigned order to determine whether each period was a protect or a control condition. Several possible techniques for trying to protect the blood in the other room had been given to each subject at the beginning of the experiment. A 35-mm slide of intact red blood cells was available for viewing, as an aid to visualization. Subjects were blind as to the number of trials being conducted and subjects were simply instructed to spend the entire 15 minutes of the protect periods trying to slow down the rate of hemolysis. During the two control periods, they were to try to think of other matters or, if that proved to be impossible, to imagine the hemolysis proceeding at its normal rate.

After the completion of the session, the experimenter escorted the subject to his office, and the subject described the techniques he or she used during the protect periods. In return, the experimenter calculated the session results and gave the subject both verbal and numerical feedback for the 20 tubes used in the four periods.

B. Analysis

The confirmation study was designed to explore the following questions:

(1) Does the rate of hemolysis differ during the protect and the control periods?

(2) Does the magnitude of the effect depend on whether one is trying to protect his or her own blood versus that of another?

(3) Can any observed psi effects be attributed to RA or IDS?

The first two of these questions can be explored by performing an analysis of variance (ANOVA) using the change scores for each of the 20 tubes as the dependent variable. There are three factors: Blood Source (own versus another, fixed, between); Condition (protect versus control, fixed, within); and Subjects (random, nested under blood source). The procedure for answering the first question depends on whether or not the results show a significant interaction between Condition and Subjects. If not, the question can be answered by looking at the main effect for Condition. A significant interaction indicates that the contrast between the protect and control periods differs for each subject. Thus, it is meaningless to consider an overall Condition effect. Instead, individual t-tests to compare protect and control period means should be performed for each subject. If it appears that within subject variability is homogeneous, then an overall estimate of that variability can be used in these tests, with the resulting increase in degrees of freedom. Otherwise, the usual two-sample t-test should be used for each subject.

The procedure for answering the second question is similar to that for the first. If there is a significant Source by Condition interaction, then the results for one's own versus another's blood should be compared within each condition. Otherwise, the question can be answered by examining the main effect for Source.

The third question cannot be answered with the ANOVA results. The extent to which IDS or RA can be used to explain observed psi results can be examined by comparing the results to those predicted by each of the two theories. In this experiment, results can be compared by using each subject's control period data to standardize the protect period data, then comparing means and variances of the two-trial and the eight-trial periods to those predicted by each of the theories. The RA theory predicts that there will be a significant shift in means away from what would be expected by chance, while the IDS theory predicts that there will be an increase in variance, but that the rate of that increase will be a function of the number of trials.

Theoretical calculations have been done to find the expected means and variances of the standardized means for the two-trial and eight-trial protect period data, under the hypotheses of chance, RA, and IDS. Since the standardization must be done using control data based on only ten trials per subject, these calculations involved central and noncentral t distributions instead of the more familiar normal distribution. Table 1 gives the expected means and variances for each of the three theories. The parameter I in the variance formula for the IDS theory is called the IDS strength parameter. The assumption is that, as a result of psi-biased data collection, the variance of the usual standardized distribution will be $(1 + I)^2$ instead of 1. The parameter $\Delta\mu$ represents the difference between the protect and control period population means; σ is the standard deviation for the control period. Notice that all three theories predict that the variance for the mean of two trials should be four times the variance for the mean of eight trials.

Table 1

EXPECTED VALUES AND VARIANCES
FOR STANDARDIZED PROTECT PERIOD MEANS

		CHANCE	RA	IDS
2 Trials	Mean	0	$1.094(\Delta\mu/\sigma)$	0
	Variance	0.707	$0.707 + 0.044\ (\Delta\mu/\sigma)^2$	$0.64\ [\ (1+I)^2 + .1\ ]$
8 Trials	Mean	0	$1.094(\Delta\mu/\sigma)$	0
	Variance	0.177	$0.177 + 0.011\ (\Delta\mu/\sigma)^2$	$0.16\ [\ (1+I)^2 + .1\ ]$

C. Simulation of RA with Salinity Data

The data from the salinity study conducted as the intermediate phase of this investigation provided an ideal opportunity to examine the soundness of the proposed methodology for testing for an RA effect. Because of the manner in which the data were collected, they should mimic the causal influence that would occur with remote action. Thus, if the methodology proposed for testing RA were to be used with these data, the results should mimic those hypothesized when RA is operational. A study was carried out at SRI to see if this would be the case.

It seems reasonable to expect that if RA is used to slow down the rate of hemolysis, the same effect could be achieved naturally by simply changing the salinity level of the solution before adding the red blood cells. This is what was done in the salinity study. (The main purpose of the study was to see if changes dictated by the pilot study had reduced the large variability in measurement under control conditions.) Thus, comparing data from two different levels of salinity should be similar to comparing data from control and protect periods if RA was used during the protect periods.

Two levels of salinity, 0.425% and 0.442%, were used for this simulation. The lower salinity level (0.425%) was used as the "protect period" data. Twenty sample points were available at each salinity value. All values were standardized by subtracting the mean of the entire "control period" data, and dividing by the corresponding standard deviation. The resulting mean for the "protect period" data was 3.365, so this value was used as the hypothesized parameter for the RA model. In other words, it was assumed that each value in the "protect period" came from a population with a mean that was 3.365 standard deviations higher

than the mean of the undisturbed population, but that the standard deviation in the protect period was the same as for the undisturbed population. This is the usual RA hypothesis.

Five random samples of size two and five of size eight were generated from each condition. The means of these samples are plotted in Figure 1, along with error bars representing one standard error of the mean in each direction. The horizontal axis represents sequence length, which was either two or eight. Both axes are represented on log scales. The horizontal and diagonal lines drawn in the body of the plot represent the theoretical predictions for the RA hypothesis, and for chance, respectively. The values resulting from the random sampling are well within the range predicted by the theories. This provides a confirmation of the methodology for testing each of these theories, by showing that situations that should mimic RA and chance do indeed result in the predicted relationship between sequence length and mean.

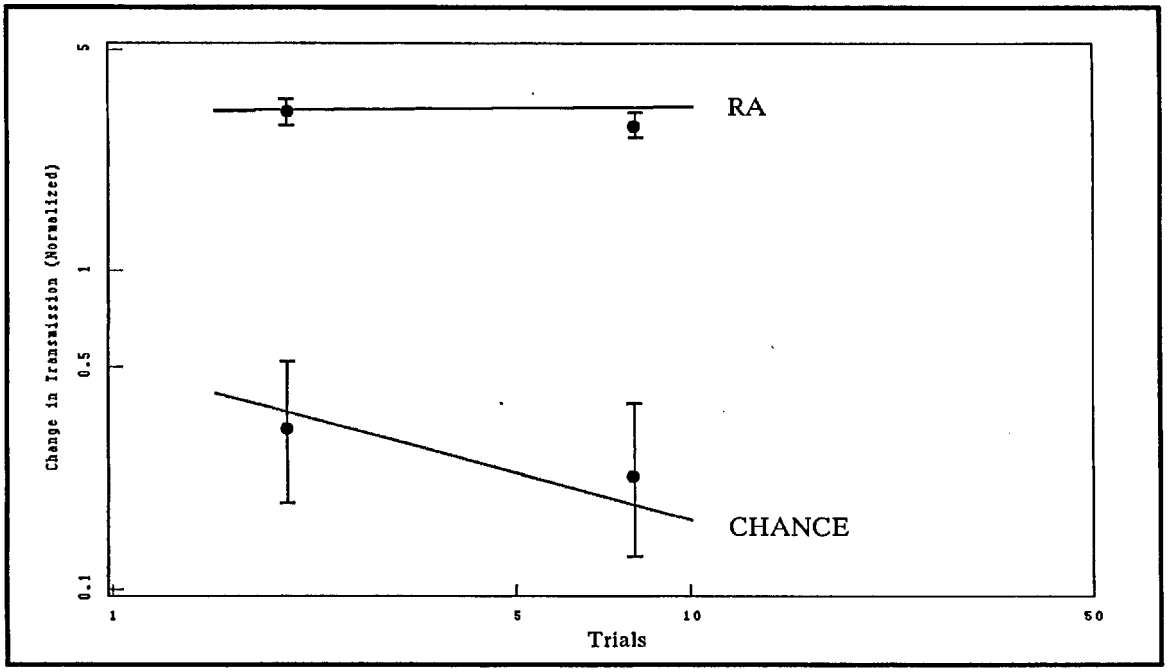

FIGURE 1 RA SIMULATION BASED ON SALINITY DATA

III RESULTS AND DISCUSSION

A. ANOVA Results

Although 60 data points were recorded for each trial, the only information used in the analysis was the difference between the averages of the first five and the last five points. This measure represented the amount of change in the red blood cells during the one-minute trial. For each of the 32 subjects, 20 of these change scores were computed, with 10 collected during the two control periods and 10 collected during the two protect periods. In addition, the information on blood source (own versus another) was available for each subject.

A three-factor ANOVA on these data was carried out at SRI International, using the Unix|Stat computer package. Source of blood (own versus another) and Condition (protect versus control) were fixed effects, while Subject was a random effect, nested under Source. The dependent variable was the change score, giving ten observations in each cell.

The ANOVA results are given in Table 1 of the Appendix. The most significant effect is due to overall differences among subjects ($p < 10^{-16}$). This heterogeneity among the red blood cells of individuals is well known, and was the motivation for collecting control period data for each subject. The only other significant effect was the Condition by Subject interaction ($p = 6.3 \times 10^{-5}$). This implies that the difference between the protect and control period means varied depending on the subject. As a consequence, comparisons must be done for each subject individually instead of over all subjects. These are done using two-sample t-tests with the ten control period tubes and the ten protect period tubes for each subject.

There was also a wide spread among the variances across subjects. For the control period data, the minimum and maximum variances for individuals were 0.304 and 9.333, respectively. Because of this heterogeneity, individual t-tests were done using separate estimates of variance instead of using the combined estimate of 2.0248 from the ANOVA table.

Results for the 32 separate t-tests are given in Table 3 of the Appendix. Two-tailed tests were used to account for the possibility of actually increasing the hemolysis rate instead of slowing it down. Nine subjects showed a significant difference ($p < .05$, $df = 18$, $|t| > 2.101$). Of these, seven showed evidence in the direction of slowing down the rate of hemolysis, and two appeared to have increased the rate. Both of the individuals in the latter group were trying to influence the

blood of another, while five of those in the former group were working with their own blood and two were working with another's. This is an interesting but *post hoc* observation, and the sample sizes are too small to attempt any conclusions. The ANOVA results did not indicate that the difference between those working on their own blood and those working on another's blood was statistically significant.

Overall, these results indicate a highly significant level of psi performance. The probability of observing 9 or more independently significant results out of 32 is only 1.9×10^{-5}. If one-tailed tests (in the direction of slowing the rate of hemolysis) had been performed, eight individuals would have shown significant results ($t > 1.73$), and the overall significance of the experiment would have been 1.4×10^{-4}.

The correction of several problems and the introduction of further measures suggested by the SOC and by SRI personnel appeared to eliminate extraneous sources of variability which had been observed in the pilot study. Apparently the noise reduction was sufficient to allow the psi signal to be detected. Contrary to what some critics of psi research have implied, tightening the protocol enhanced the psi results instead of reducing them to chance.

B. RA Versus IDS Results

Because of the extreme variability in the characteristics of human red blood cells and the wide range of times (14 to 42 hours) between blood collection and testing, it is impossible to determine what rate of hemolysis should be expected by chance alone. For this reason, separate control periods were interspersed with the protect period for each subject. To examine the RA and IDS hypotheses, the protect period data first needed to be standardized, so that they could be compared across subjects. To do this, the mean and standard deviation of the ten control period tubes were computed for each subject. Standardized protect period scores were computed by subtracting these means and dividing by the standard deviations for each of the ten protect period values for each subject. Assuming that a given individual's control and protect period data came from the same distribution, these standardized scores (modified slightly by a constant) would follow a Student's t distribution with nine degrees of freedom. This assumption was used to compute the theoretical mean and variance shown in Table 1 under the chance hypothesis.

It was assumed that if RA occurred, it would take the form most commonly accepted, i.e., the mean for the protect period would differ from the mean for the control period but the variance would not. The magnitude of this mean shift is denoted in Table 1 by $\Delta\mu$.

It was also assumed that if IDS occurred, it would take the form of inflating the variance of the final z-score distribution from 1.0 to $(1.0 + I)^2$, but the amount of inflation would be independent of the number of trials used to compute the z-score. In this case, that was equivalent to assuming that the average of the unstandardized protect period scores would have the same mean as the control period scores, but they would have a variance of $(1 + I)^2 \sigma^2/n$, where σ^2 is the variance of the control scores.

The usual procedure for comparing RA and IDS is to plot the log of the mean shift for various sequence lengths against the log of the sequence length. IDS theory predicts that the slope of the resulting line would be -0.5.

In order for this procedure to be able to distinguish between the two hypotheses, however, the data must conform to certain results which are predicted by both theories. One is that the ratio of the variances of the means for two sequence lengths should be inversely proportional to the ratio of the sequence lengths. As can be seen in Table 1, for this experiment the ratio of variances for the mean of two trials versus the mean of eight trials should be close to four. This result should hold for any of the three hypotheses proposed.

Table 2 shows the sample means and standard deviations across all 32 subjects, for the averages of the tubes collected in the two- and eight-tube protect periods, respectively. The change scores were standardized as described above before these averages were computed.

Table 2

MEANS AND STANDARD DEVIATIONS FOR STANDARDIZED PROTECT DATA

N of Tubes	Mean	Standard Deviation
2	-0.387	1.071
8	-0.134	0.810

As can be seen by these values, the ratio of variances for the two sequence lengths is only 1.75, which is much smaller than the value of 4.0 predicted by all three hypotheses. This implies that the data contain anomalies not covered by any of the theories. One obvious possibility is that the level of psi functioning is different for each individual. The calculations for each of the

theories must necessarily assume that if that mechanism is at work, it is functioning at the same level for each individual. Results in other areas of psi research have indicated that level of psi functioning is extremely heterogeneous across individuals, so this assumption may be too restrictive. If either IDS or RA is functioning in different amounts for each subject, it would be impossible to predict what to expect in the combined results under investigation. Future studies of this type should be conducted using a single subject, or at least analyzing the data from each subject separately. In the present study, the data available are insufficient to ascertain whether an individual was following the RA or the IDS model.

It is interesting to estimate the psi parameters by comparing the formulas in Table 1 with the values in Table 2. This provides further evidence that the data do not support either theory. The IDS strength parameter, I, would be estimated to be 0.298 or 0.996, based on the standard deviations for the two- and eight-tube conditions, respectively. The standardized mean shift, $\Delta\mu/\sigma$, is estimated to be -0.354 or -0.122 based on the means in Table 2, and -3.16 or -6.60 based on the standard deviations. Such large inconsistencies would not occur if either theory were valid for this experiment uniformly across subjects.

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Approved For Release 2000/08/10 : CIA-RDP96-00787R000300090001-1

APPENDIX

ABSTRACT: A formal investigation was conducted in order to determine whether a relatively large number of unselected subjects would be able to exert a distant mental influence upon the rate of hemolysis of human red blood cells. For each of 32 subjects, red blood cells in 20 tubes were submitted to osmotic stress (hypotonic saline). The subjects attempted to protect the cells in 10 of the tubes, using visualization and intention strategies; the remaining 10 tubes served as non-influence controls. For each tube, rate of hemolysis was measured photometrically over a 1-minute trial period. Subjects and experimenter were "blind" regarding critical aspects of the procedure, and subjects and tubes were located in separate rooms in order to eliminate conventional influences. Results indicated that a significantly greater number of subjects than would be expected on the basis of chance alone showed independently significant differences between their "protect" and "control" tubes ($p = 1.91 \times 10^{-5}$). Overall, blood source (i.e., whether the influenced cells were the subject's own cells or those of another person) did not significantly influence the outcome. Additional analyses of the results were performed by SRI International researchers to determine whether the data were better described by remote action (causal) or by intuitive data sorting (informational) predictions; results of those analyses are presented in an appended paper.

Approved For Release 2000/08/10 : CIA-RDP96-00787R000300090001-1

REMOTE INFLUENCE OF HEMOLYSIS RATE: A CONFIRMATION STUDY

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I INTRODUCTION

In a preliminary experiment conducted in our laboratory several years ago, a selected subject was able to mentally influence (retard) the rate of hemolysis of human red blood cells (Braud, Davis & Wood, 1979). In that experiment, the blood cells were stressed osmotically by a hypotonic saline solution, and rate of hemolysis was measured photometrically. The significant in vitro effect was interpreted as a successful psychokinetic influence upon a living target system. Throughout this past year, additional experiments were conducted in order to test the generality of this remote influence effect, and to determine whether the effect might be most parsimoniously explained as a true psychokinetic (remote action) effect or, alternatively, as an instance of intuitive data sorting (see May, Radin, Hubbard, Humphrey & Utts, 1985).

The preliminary experiment had involved a single selected subject and a relatively small number of trials. The present experiments involved many more trials, a large number of unselected subjects, and an improved methodology. Briefly, subjects attempted to mentally retard the rate of hemolysis of osmotically stressed human red blood cells which were isolated from all conventional influences. The subjects and the target system were kept in separate rooms. Rate of hemolysis was accurately monitored by a spectrophotometer interfaced by means of an analog-to-digital converter to a microcomputer. The experimenter operating the equipment was blind regarding the timing of the influence (protect) versus noninfluence (control) attempts. Both experimenter and subject were blind regarding the blood source (subject's own blood versus another person's blood).

Summary of the Pilot Phase

Thirty-two unselected subjects participated in a Pilot study designed to explore the new methodology and to determine whether blood source (own blood cells versus another person's blood cells) was an important factor. An experimental session involved hemolysis measurements for ten blood tubes. The subject attempted to retard the rate of hemolysis of five of these tubes, mentally and at a distance. The remaining five tubes served as control tubes which the subject did not attempt to influence. The five influence and five control tubes were scheduled according to a random sequence which was prepared by a third party and which was unknown to the experimenter who made the hemolysis measurements. Light transmission through each tube (which is proportional to hemolysis) was measured for each second of a two-minute sampling period; the difference between the mean of the initial five seconds and the final five seconds of light measurements yielded a change score which served as the hemolysis measure. Following the completion of the experimental

session, ten additional blood-containing tubes were measured for hemolysis rate. It was intended that these ten measurements would provide additional "non-local" baseline data, and would also be useful in comparing remote action (RA) versus intuitive data sorting (IDS) predictions of the experimental outcome. According to the RA hypothesis, the mean of the five "local" control tubes should be equivalent to the mean of the ten nonlocal baseline tubes, and the mean of the five influence tubes should be lower (i.e., in the direction of less hemolysis or greater protection of the cells) than both of the former means. According to the IDS hypothesis, the mean of the local controls should be above, and that of the influence tubes should be below, that of the nonlocal baseline tubes; the grand mean of the ten tubes for the experimental session should not differ from the mean of the ten nonlocal baseline tubes.

An analysis of variance of the hemolysis scores indicated extremely great and highly significant variability among the subjects, but no other significant main effects or interactions. Therefore, significant evidence for a remote influence of the blood cells was not obtained in the Pilot study. There was, however, a nonsignificant tendency for a slight "protection" effect in the "another's blood" condition, while the opposite effect (i.e., less protection during the influence trials) occurred in the "own blood" condition. The nonlocal baseline measurements were found to be inadequate for their intended purpose since, in every case but one, the mean percent light transmittance change score for the ten nonlocal baseline tubes was lower than both experimental sessions means (i.e., consistently lower than both the control and the influence tube means). It was determined that this consistent reduction in hemolysis for the nonlocal baseline tubes (and, to a lesser extent, for the tubes later in the experimental sessions as well) was due to a progressive change in the blood cells contributed by several environmental factors which increased the "noise" level of the experiments and which included higher apparatus (i.e., spectrophotometer tube holder) temperatures during later tests, and increasing exposure of the blood cells to temperature changes, air, and mechanical trauma (i.e., mechanical agitation) during the course of repeated tests of a single blood sample (i.e., multiple tests of the contents of a single Vacutainer blood collection tube). As a result of the Pilot sessions themselves, as well as additional tests conducted concurrently with and subsequent to the Pilot experiment, the sources of these interfering factors were identified and steps could be taken to eliminate or greatly reduce them in the Confirmation study.

Temperature changes in the spectrophotometer tube holder were controlled through (a) the addition of an external cooling fan to the apparatus, (b) reducing the durations of the hemolysis measurement periods, and (c) turning off the apparatus except when measurements were actually being made. The substitution of a more effective anticoagulant (acid-citrate-dextrose) for that used in the Pilot study (heparin) greatly diminished the effects of progressive exposure to room temperature, air, and mechanical trauma during repeated pipette samplings, so that hemolysis rate now remained relatively stable over the course of twenty measurements from a given main Vacutainer source tube. When between 20 and 30 samples had been taken from a main Vacutainer tube, this stability began to deteriorate.

Summary of the Intermediate Phase of Salinity Tests

Following the completion of the Pilot study, salinity tests were conducted

in order to determine salinity values that might mimic anticipated psi-induced hemolysis rate changes. These tests provided the basis for Monte Carlo analyses at SRI International, which were designed to determine appropriate parameters for an adequate differential test of the IDS versus RA predictions of psi functioning which was to be conducted in the Confirmation study.

A total of 332 hemolysis trials were completed, using whole blood samples collected from ten different persons. For these tests, the "noise-reducing" improvements mentioned above were incorporated. Hypotonic salinity values of 0.425%, 0.429%, 0.434%, 0.442%, and 0.450% (corresponding, respectively, to 50%, 50.5%, 51%, 52%, and 53.33% of 0.85% Normal physiological saline) were tested. Sampling epochs of one-minute duration were used, rather than the two-minute periods of the Pilot study. All other procedures were identical to those of the Pilot study. These were all, of course, "control" tests in which no subjects attempted to influence the hemolysis process.

As anticipated, the "noise-reducing" improvements resulted in the virtual elimination of the extreme variability seen in the Pilot study, and yielded much greater stability (less degradation) of the blood samples. The optimum salinity value for mimicking an anticipated psi-induced reduction of hemolysis rate of approximately 1.0 standard deviation was found to be in the vicinity of 0.429% - 0.434% saline (equivalent to 50.5% - 51.0% of Normal 0.85% physiological saline). Monte Carlo simulation analyses conducted on these salinity data by Scott Hubbard and Ed May at SRI International indicated that, on the basis of the magnitudes of hemolysis changes observed in these Intermediate Phase salinity tests, the use of 2 versus 8 samples (tubes) distributed throughout equivalent "psi effort" periods would provide adequate measurements for a differential test of the IDS versus RA interpretations of any obtained psi effects in the Confirmation experiment. Details of these Monte Carlo simulations are provided in Appendix A.

Overview of the Confirmation Study

On the basis of the findings of the preliminary study, the Pilot study, and the Intermediate Phase experiments, a formal protocol for the Confirmation study was developed which included the following features.

1. Thirty-two subjects (from the same population, and selected in the same manner, as in the Pilot) would each participate in one experimental session. Hemolysis measurements would be made by the experimenter, W. B.

2. Sixteen subjects would attempt to influence (protect) their own blood cells, and sixteen would attempt to influence the cells of another person. Both subject and experimenter would be blind regarding the source of the blood until all 32 sessions had been completed. This "own versus other" factor is retained in the Confirmation study because of the trend toward different outcomes in those two conditions observed in the Pilot study.

3. Blood samples would be collected in Vacutainer tubes containing acid-citrate-dextrose (ACD) anticoagulant and would be refrigerated immediately after the blood was drawn. Blood samples would be stored at 4 degrees Celsius and would be removed from the refrigerator only briefly, before each hemolysis trial.

4. Hemolysis trials would be conducted between 14 and 42 hours following a blood draw. The ACD anticoagulant permits cold storage of blood cells for as long as three to four weeks with minimal deterioration of red blood cells.

5. The temperature increase of the spectrophotometer would be minimized

by means of an external cooling fan, the use of shorter sampling epochs, and allowing the apparatus to remain on only during hemolysis measurement periods.

6. A session would consist of four fifteen-minute periods--two control (C) periods and two protect (P) periods. For half of the subjects, these periods would be scheduled in a CPPC order; for half of the subjects, a PCCP order would be used. This block-counterbalancing design is employed in order to assure that any reasonably linear potential progressive error (such as changes in hemolysis rate due to slight progressive warming of the apparatus) would contribute equally to the two (C and P) conditions and therefore not introduce a systematic bias. Whether a given subject's sequence is CPPC or PCCP would be randomly determined by an associate (M. S.) through use of a RAND table of random numbers. The experimenter doing the hemolysis measurements would, of course, be blind regarding these sequences. A subject would learn his or her proper sequence by consulting a sealed envelope delivered to the subject after the experimenter's interactions with the subject had been completed and the experimenter had returned to his equipment room.

7. The beginning of each fifteen-minute period would be signalled by an appropriate number of tones delivered to the subject's headphones. The subject would have been instructed to attempt to mentally decrease the rate of hemolysis of the distant red blood cells during the two fifteen-minute protect periods. During the two fifteen-minute control periods, the subject would attempt not to think about the experiment and would allow the cells to hemolyze at their normal, rapid rate. During the two protect periods, the subject would view a projected color slide of healthy, intact red blood cells as an aid to visualization and intention. During the two control periods, the subject would close the eyes and think about matters unconnected with the experiment.

8. During each fifteen-minute period, either two or eight hemolysis tubes (samples) would be measured. Monte Carlo analyses conducted at SRI International have indicated that curves derived from two versus eight tubes (samples) would be sufficient for an adequate test of the IDS versus RA interpretations of any obtained psi effect. The subject would be blind regarding the number of tubes being measured during any fifteen-minute period, and would have been instructed to apply mental effort as steadily and as consistently as possible throughout the entire fifteen-minute protect periods. The experimenter would learn whether to measure two or eight hemolyis tubes during each fifteen-minute period by consulting a sealed envelope delivered to him just before the beginning of his measurement session. This random, balanced tube sequence would have been determined earlier by M. S., again using the RAND table of random numbers.

9. Because the subjects must remain blind regarding the number of tubes being measured during each fifteen-minute period, it would not be possible to provide them with real-time auditory feedback of the progress of hemolysis, as we had hoped to do. Such feedback would provide subjects with information about the number of tubes and would therefore violate the blindness requirement and add a psychological confound to the experiment. However, the subject would receive numerical feedback about hemolysis outcomes at the conclusion of the session.

10. The subject's session would be preceded by eight minutes of tape-recorded instructions for relaxation and guided imagery, designed to help reduce distractions and focus attention upon the desired goal event--viz., decreased hemolysis during effort (protect) periods.

11. Hemolysis measurements would be accomplished using a procedure identical to that used in the Pilot study, with the following exceptions: (a) the recording epochs would be one minute rather than two minutes in duration,

and (b) the subject would not hear tones signalling the beginning and end of each tube measurement (as in the Pilot study), but rather would hear tones signalling the beginning of each of the four fifteen-minute periods.

12. Hemolysis scores would be analyzed in a manner identical to that described in the Pilot study. A similar ANOVA would be used to assess the presence of a psi effect. In addition, all hemolysis percent change scores would be normalized for purposes of additional IDS versus RA analyses.

II METHOD OF APPROACH

Subjects

Thirty-two subjects participated in the study. Participants were selected from a pool of normal, healthy individuals and were screened to eliminate those with known allergic or immunological disorders or other illnesses, and those currently taking medication (other than oral contraceptives and/or occasional cold medicines). A screening form is included as Appendix B. Twenty-one of the subjects had already participated in the Pilot investigation, and were asked to participate again because of their familiarity with the procedure. Eleven subjects were first-time participants who substituted for Pilot subjects who were unable to take part in the Confirmation. The final sample consisted of seventeen females and fifteen males, ranging in age from 23 to 53 years. Each subject was paid twenty dollars as a token of appreciation for the inconvenience and slight discomfort of donating a blood sample, and for participating in the subsequent one and one half hour laboratory session.

Procedure

On a Monday evening, the experimenter met with a group of four participants in order to explain the experiment in detail and to have the subjects complete an Informed Consent Form (included as Appendix C), donate a 10 ml venous blood sample, and schedule an appointment for an experimental session for later that same week (i.e., on either the next day [Tuesday] or the day after [Wednesday]). An attempt was made to schedule two experimental sessions on Tuesday (at 10:00 am and at 2:00 pm) and two sessions on Wednesday (at 10:00 am and at 2:00 pm). On the Monday evening, the participant was given a two-page written description of the procedure and was asked to read the description at home and become familiar with it. This description is included as Appendix D.

The four blood samples were drawn by a Registered Nurse.[2] The blood collection tubes (Becton Dickinson Vacutainer tubes containing acid-citrate-dextrose anticoagulant) were labeled with the names of the blood donors and were placed in a small refrigerator immediately after the blood draws. The refrigerator was maintained at 4 degrees Celsius throughout the experiment. When all four blood samples had been drawn, the nurse switched the name labels on two of the tubes, using a randomizing schedule which had been prepared ahead of time by an associate of the experimenter (M. S.). This schedule was always kept by the nurse (and a copy kept by M. S.) and was unknown to the experimenter until the study had been completed. The purpose of switching the labels of two tubes was to permit two subjects to attempt to influence their own blood and two to attempt to influence another person's blood that week, and to keep the subjects and the experimenter blind regarding the blood source[3] until all thirty-two sessions of the study had been completed.

Following his or her arrival for the experimental session on Tuesday or Wednesday, the experimenter showed the subject the equipment at the target site, emphasizing the spectrophotometer tube holder in which the target tubes later would be placed sequentially, and then escorted the subject to the distant subject room, located in another part of the building (see floor plan included as Appendix E). The subject sat in a comfortable arm chair, and was told that shortly after the experimenter left the subject's room, an assistant would slip an envelope under the subject's door. The subject was to retrieve that envelope and open it to find the random sequence of the four fifteen-minute periods of the experiment. [The thirty-two period-sequence envelopes had been prepared beforehand by M. S. using a RAND table of random numbers and a private algorithm. Throughout the experiment, the envelopes remained hidden from the experimenter. M. S. retained a copy of the period sequences for the thirty-two envelopes.] During each of the two fifteen-minute control periods, the subject was to attempt to keep her or his mind off of the experiment and to think of other matters; if she or he could not help thinking about the experiment, the subject was asked to imagine hemolysis proceeding at its normal, rapid rate. During each of two fifteen-minute protect periods, the subject was to attempt to mentally retard the rate of hemolysis of the red blood cells in the tubes for that period, using any of the mental strategies described on the instruction sheet (see Appendix D). The experimenter demonstrated a slide projector which could be used by the subject during the two protect periods. The 35 mm color slide depicted healthy, intact red blood cells, and was included as a helpful aid to the subject's visualization of the desired goal. The subject was told that the beginning of each period would be signalled by an appropriate number of tones (one for Period 1, two for Period 2, and so on) presented through headphones. The subject was also told that the first period would be preceded by an eight-minute progressive relaxation and guided imagery exercise designed to help the subject reduce distractions and focus attention upon the desired goal event, i.e., decreased hemolysis during the protect periods. A transcript of this exercise is included as Appendix F. The exercise was accompanied by low volume, ambient music and ocean sounds. Low volume ambient music was also presented through the subject's headphones throughout the four periods of the experiment, and was interrupted only for the four period-signalling tone presentations. The conclusion of the experiment was indicated to the subject by the cessation of the music. At that time, the subject was to sign and date his or her period sequence sheet (see Appendix G), and then be escorted back to the apparatus room by an assistant.

The experimenter returned to the apparatus room, where the equipment had already been readied for use. Just before entering this room and closing the door, he indicated to an assistant that the experiment was about to begin. The assistant gave him a sealed envelope that contained information about his two-versus eight-tube sequence for that session, and then delivered another sealed envelope to the subject; this latter envelope contained the subject's protect versus control period sequence for that session. The experimenter started the audio tape which presented the preliminary exercises to the subject. He then conducted the twenty hemolysis measurements for the session. From his point of view, there were also four fifteen-minute periods of measurements; two of the periods (indicated on a sheet within his envelope) were to involve measurements of two tubes, and two of the periods were to involve measurements of eight tubes. This tube-number factor was included to provide data for a differential test of the IDS and RA predictions of psi performance (see below). The

subjects remained blind regarding the tube number schedule for the session.

Each of twenty identical 10-ml glass spectroscope tubes had been filled beforehand with 6.0 ml of 0.425% saline, and had been kept in the refrigerator at 4 degrees Celsius. The saline for all tubes for all sessions came from the same stock solution of 0.85% normal physiological saline, purchased in 20 liter quantity from Fisher Scientific Supply Company and diluted with distilled water to 0.425% by the experimenter before the study began. This use of solution from the same stock eliminated variability that otherwise might have been contributed by that factor. The experimenter removed the main blood collection (Vacutainer) tube bearing that subject's name from the refrigerator, inverted the tube eight time in order to assure a homogeneous suspension of its blood cells, opened the tube, and placed it in a test tube rack on the equipment table. He then removed the first of the hypotonic saline tubes from the refrigerator and allowed it to stand at room temperature and warm slightly so that moisture from the warmer room-temperature air no longer condensed on the tube after the latter was wiped with tissue. He placed the now frost-free saline tube into the holder of the spectrophotometer and adjusted the controls of the device so that a digital reading of precisely 100.0% light transmission was obtained for this blank tube. He pressed a computer keyboard key to initiate a subroutine that signalled the subject in the distant room that a fifteen-minute period was about to begin. He next removed the tube from the holder and added to the tube 100 µl of whole blood from the main Vacutainer tube. He quickly stoppered the saline tube with a rubber stopper, inverted the tube twice to assure homogeneity of its contents, and quickly replaced the tube in the spectrophotometer holder. When the holder cover was closed, the chart recorder pen moved to indicate minimal light transmittance; at the point of greatest excursion of the pen, the experimenter pressed a keyboard key to initiate the one-minute sampling epoch for that tube. The Vacutainer blood collection tube was then returned to the refrigerator, and the next hypotonic saline tube was placed in the test tube holder, so that it might warm slightly for the next trial. The precise timing of all procedural events was controlled by the experimenter through the use of several procedural cues and by means of extreme stereotypy of responding. Throughout the sampling epoch, the chart recorder and the digital readout of the spectrophotometer were shielded so that they could not be observed by the experimenter. This was done in order to eliminate immediate feedback to the experimenter in hopes that this might reduce the latter's own psi contribution to the experimental outcome.

Percent light transmittance measures at a wavelength of 660 mµ (an absorbance minimum for hemoglobin) relative to the blank tube containing saline alone were taken by means of a Sequoia-Turner Model 390 spectrophotometer with digital and chart recorder readouts. The spectrophotometer provided an analog output that varied from 0 to 1.0 v DC and was linearly related to percent light transmittance (with 0 v DC = 0% T and 1.0 v DC = 100% T). This output was increased by a factor of 10, by means of a differential amplifier, and the resulting 0 to 10.0 v DC signal was fed into an analog-to-digital converter installed in an IBM PC-XT compatible computer. The A/D converter (CGRS Microtech PC DIADAC 1) uses an industry standard AD 574A 12-bit A/D chip with 0.0024 volt accuracy and 35 µsec conversion speed. A software program was written which sampled the A/D converter at the end of each second of the one-minute trial period. Thus, the system automatically provided 60 measurements of the time course of hemolysis (i.e., percent transmittance) during each one-minute trial. The 60 values were written to a floppy disk file and were also

printed out at the end of the trial. In addition to this digital data collection, an analog chart record was obtained for each trial (using a Markson Model 1202 pen recorder).

At the end of the one-minute sampling epoch, the experimenter removed the tube from the holder and began his preparations for the remainder of the trials. Approximately one minute elapsed between trials. If a period called for the measurement of two tubes, those two tubes were measured at the middle of the fifteen-minute period, i.e., at times corresponding to the measurement of tubes 4 and 5 of an eight-tube period. The main Vacutainer blood collection tube and the hypotonic saline tubes remained in the refrigerator except when needed for the measurements. The completion of the hemolysis measurements for the twenty tubes of an experimental session required one hour.

When the twentieth and final tube had been measured, and the results had been printed, the experimenter notified his assistant that the session was over. While the assistant went to the subject's room, the experimenter made photocopies of the data sheets and of his tube-number schedule. When the assistant returned with the subject, the assistant photocopied the subject's control/protect period sequence sheet. The assistant and the experimenter then exchanged copies of their respective sequence sheets and data printouts. These duplicate records were filed for safekeeping by the assistant and by the experimenter.

The experimenter and the subject then went to the experimenter's office and the subject described the techniques used to attempt to influence the blood cells. After this interview, the experimenter calculated the results for the experimental session and provided the subject with information about the session outcome. This information consisted of verbal and numerical feedback about the hemolysis rates for the twenty tubes. The experimenter thanked the subject for his or her participation, and the subject left the laboratory.

III RESULTS

When all 32 experimental sessions had been completed, the blood source information was decoded so that a determination could be made of which subjects attempted to influence their own blood and which attempted to influence blood from another person. For each session, change scores were calculated for each of the 20 blood sample tubes (trials). For each tube (trial), the mean of the initial five A/D converter values was subtracted from the mean of the final five A/D converter values. This change score represented the change in percent light transmittance from the first five seconds to the last five seconds of the one-minute trial and provided a quantitative measure of the rate of hemolysis for a specific blood sample tube. For each subject, change scores were available for ten control tubes and ten influence (protect) tubes, and for each tube condition, scores were available for either two or eight tube measurements during each fifteen-minute period. Using these change scores, a three-factor analysis of variance was used to test the major hypotheses of the study. In this ANOVA, the three factors were: blood Source (own versus another's, between); Subjects, random and nested under Source; and Condition (protect versus control, within). The three experimental questions explored in this confirmation study were the following.

1. Would the rate of hemolysis (change scores) for the protect tubes differ from that for the control tubes? Such an effect would be indicated, in

the absence of a significant Condition x Subjects interaction, by a significant Condition main effect in the ANOVA. Should the Condition x Subjects interaction effect prove significant, the condition effect would be examined separately in each of the individual subjects, using appropriate within-subject error estimates.

2. Would the degree of influence of hemolysis rate differ for the two blood sources (own cells versus another's cells)? Such an effect would be indicated by a significant interaction of the Source and Condition factors of the ANOVA.

3. Would results for the two-tube measuring periods differ from those for the eight-tube measuring periods, and would the function describing this two- versus eight-tube effect match more closely the RA or the IDS prediction? This third (tube number) experimental question is treated by Scott Hubbard in an appended document and will not be discussed further in this paper.

For tests of significance, alpha was set at $p = .05$.

The summary table for the ANOVA is given in Table 1, and means and standard deviations for the various groups and conditions are given in Table 2.[4] The main effects for Condition and Source did not reach significance, nor did the Source x Condition interaction. However, the main effect for Subjects and the Condition x Subjects interaction were highly significant. The former effect, of course, indicates significant variability in performance among the 32 subjects of the experiment. The significant Condition x Subjects interaction indicates that the effect of condition (protect versus control) differed from subject to subject; therefore, an interpretation of the Condition main effect was inappropriate and individual, subject by subject condition comparisons were called for. These individual comparisons were made by means of matched t tests, computed for each of the 32 subjects, and calculated by comparing the hemolysis (change) scores for a subject's ten protect tubes with the scores for his or her ten control tubes. The t scores for the individual subjects are presented in Table 3. The independently significant subjects (i.e., those with $|t| > 2.101$, 18 df, $p < .05$, two-tailed) are indicated by asterisks.[5] The condition effect was significant in nine of the 32 subjects. In seven of those subjects, scoring was in the direction of psi-hitting (i.e., slower hemolysis in the protect than in the control tubes); in two subjects, scoring was in the direction of psi-missing (i.e., faster hemolysis in the protect than in the control tubes). This is to be compared with the 1.6 significant scorers expected on the basis of chance alone. The probability of observing nine independently significant scorers among 32 subjects is 1.91×10^{-5} (binomial test). In order to determine whether these nine independently significant subjects show a general tendency toward hitting, a single-mean t test may be calculated for the nine t values, comparing them with MCE = zero; such a test yields evidence for significant hitting ($X = 1.63$, $SD = 2.23$, $t = 2.07$, 8 df, $p = .035$, one-tailed).

In the overall (ANOVA) analysis, no effect was found for the Source variable: Scores for the "own" and "another's" groups were virtually identical. The Source x Condition effect, which would have indicated a dependence of the protect versus control effect upon the source of the blood, was clearly nonsignificant. Therefore, we must conclude that blood source was not an important variable in this investigation. However, an interesting trend emerges when we examine blood source for the nine independently significant subjects. For this subgroup (for which there was evidence for a psi effect), a comparison of the t scores of the five subjects who influenced their own blood

with those of the four subjects who influenced another person's blood yields a trend of greater positive scoring (i.e., psi-hitting) for the "own blood" subjects (see Table 4). Because of the small number of subjects involved in the comparison, this trend is not significant ($t = 1.73$, 7 df, $p = 0.12$, two-tailed). The large magnitude of the difference, however, suggests that blood source would be an interesting variable to explore in future studies of this type.

IV DISCUSSION

As expected, within- and between-subjects variability in this Confirmation experiment was greatly reduced by the changes in experimental protocol that resulted from observations made in the Pilot and Intermediate Phase experiments. This reduction in the experiment's "noise" level permitted the observation here of psi effects which could not be detected iin the Pilot study. Significant differences in rate of hemolysis between experimental (i.e., mentally "protected") and control blood samples were found in an extra-chance number of subjects.

It may be possible to discover important differences between subjects who exhibited significant positive scoring and those who exhibited significant negative scoring or chance scoring through detailed psychological analyses which would consider both short-term ("state") and more persistent ("trait") characteristics of the subjects. State analyses could focus upon the types of mental strategies used by the subjects in their attempts to influence the target cells. Some subjects, for example, employed a direct strategy of visualizing the blood cells in a very realistic manner, while other subjects employed a more indirect strategy of visualizing objects that were similar to the blood cells and possessed characteristics similar to those that protected cells might possess. Are more direct strategies more effective than indirect strategies based upon associations and symbolic representations? Trait analyses could be accomplished by asking all participants of the Confirmation study to return to the laboratory for various personality assessments. Such assessments would, of course, be carried out by laboratory personnel who are blind to the subjects' hemolysis results. Initial assessments might involve psychological instruments such as the Myers-Briggs Type Indicator and the Participant Information Form which have already been shown to correlate with other types of psi performance (e.g., Berger, Schechter, & Honorton, 1985; Honorton, Barker, Varvoglis, Berger & Schechter, 1985).

In the present study, several factors may have interfered with the emergence of even stronger psi effects. These factors were (a) the presence of relatively large individual differences in the characteristics of the subjects, (b) the long durations of the psi "effort" periods and of the experimental sessions as a whole, and (c) the absence of real-time feedback to the subjects concerning the state of the target system. Factor (a) could be minimized in future studies by more stringent selection of participants in terms of prior histories of successful bio-PK performance and of personality characteristics known to be correlated with psi performance. Factors (b) and (c) were necessitated by the "tube number" component of the present design (i.e., the assessment of two versus eight tubes in each fifteen-minute protect or control period). Lengthy "effort" periods were required to accommodate the measurement of eight tubes, and the requirement of keeping the subject "blind" to the number of tubes prevented the administration of feedback, since the latter

would have allowed the subject to keep track of the number of tubes measured. Future experiments unconcerned with a tube-number factor could include briefer psi-influence periods and could also provide feedback. It should be noted, however, that there exists a growing body of evidence that suggests that real-time sensory feedback to the subjects is not a necessary condition for the occurrence of strong psi effects (e.g., Berger, 1986, 1987; Braud, 1978).

The major purpose of the present study was to determine whether a significant psi effect involving hemolysis could be observed using a large number of unselected subjects and an improved experimental protocol. The extra-chance number of independently significant subject performances provides an affirmative answer to this question. A secondary goal of the study was to explore the issue of whether an intuitive data sorting (IDS) interpretation or a remote action (RA) interpretation provides a better explanation of the results. According to an RA interpretation, the subjects (or the experimenter) actually retard hemolysis rate in a causal or quasicausal manner, yielding values which would not have occurred in the absence of influence attempts. According to an IDS interpretation, the experimental personnel take advantage of already existing fluctuations of hemolysis rate among different blood samples, "sorting" those values by the scheduling and timing of their trials so as to produce an effect which simulates a causal effect. It is important to remember that an IDS effect is still a psi effect, but an informational rather than a causal one.

There were several opportunities for intuitive data sorting in the present experiment. The person (M. S.) who provided the random schedule for blood source, tube condition, and tube number used a fixed rule which involved converting published weather information into an entry point for a table of random numbers. However, arbitrary decisions were still possible in assigning odd or even digits to the various sources, conditions, and tube numbers, and such decisions by M. S. provided possible entry points for IDS which could influence both between- and within-subject effects. A second possible source of sorting involved subject scheduling for the initial blood drawing sessions. Which subjects happened to arrive at the laboratory on a given Monday evening for blood drawing would determine their places or positions in the test schedule, and hence the particular blood samples that would be assigned to them; this could provide additional IDS entry points. Subject-scheduling IDS effects could be mediated by the experimenter (W. B.), by the laboratory personnel who suggested and scheduled potential subjects, and/or by the subjects themselves. A third possible source of sorting involved the experimenter's hemolysis measurements. By consciously or unconsciously altering the timing of his actions, he could determine the start point of the measured hemolysis curve and this in turn could influence the hemolysis rate measure. The experimenter was aware of this possibility and therefore exercised great caution in maintaining the consistency and stereotypy of his laboratory technique in an attempt to obviate this factor. Only automated procedures could eliminate this factor, and even then, the elimination may or may not be absolute, depending upon the completeness of the automation. It is important to note that deliberate timing changes could influence only the tube number effect in the present experiment, since this was the only independent variable for which the experimenter was not blind. Since he was unaware of the blood source or of the scheduling of the protect versus control periods, any timing changes that could influence those two effects would necessarily have to be psi-mediated. It should be added that subjects may have influenced

hemolysis rate indirectly by exerting a true, causal remote action influence upon the experimenter's timing behavior, so that what appears to be IDS by the experimenter could in reality be RA by the subject. As the reader will begin to appreciate, a truly definitive test of the IDS model, or even a definitive identification of IDS and RA components is an exceedingly complex and difficult task.

The issue of whether the results of this experiment are described more closely by an IDS model or by an RA model is treated in an Addendum prepared by Scott Hubbard of SRI International, and will not be addressed further in this Discussion.

In the blood experiments reported here, the hemolysis process occurred in vitro and was produced by osmotic stress. Caution should be exercised in the generalization of the results of this study to in vivo hemolysis. In the body, red blood cell lysis can occur through osmotic stress, but is more often contributed by other factors (Hillman & Finch, 1974; Ponder, 1971).

The rationale for selecting blood cells was that perhaps material which had once been part of the body might be more susceptible to distant mental influence than would be the case for more "alien" biological materials. At the very least, the use of such "familiar" material would be expected to increase the participants' motivational levels and hence increase the likelihood of positive results. Red blood cells were chosen as "targets" for these initial bio-PK investigations since their rate of hemolysis could be measured by means of the equipment and facilities available to us. However, this choice was not without its difficulties since the biological status of red blood cells is somewhat peculiar. On the one hand, human mature red blood cells have no nucleus, cannot reproduce, and have lmiited lifespans (approximately 120 days). On the other hand, as Ponder (1971) notes, "On metabolic grounds, mammalian erythrocytes are living cells; although in absolute terms the rates of respiration and of glycolysis are small, from the standpoint of cellular physiology the metabolism is far from negligible" (p. 366). Red blood cells certainly qualify as biological systems. In future cellular bio-PK investigations, however, perhaps the use of white blood cells or of artificially cultured neural cells may yield more dramatic results than those obtained in the present study (see Braud, 1986).

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FOOTNOTES

[1] I am indebted to Rick Berger, Steve Dennis, Scott Hubbard, Kay Mangus, Diane Morton, Julie Nixon, Marilyn Schlitz, Winona Schroeter, and Jessica Utts for their important contributions to various phases of this investigation.

[2] The order in which the subjects' blood was drawn, and hence their subject numbers for the blood source factor (i.e., whether they subsequently attempted to influence their own or another person's blood) was determined by the alphabetical sequence of the surnames of the four subjects who assembled on any given Monday evening blood-drawing session.

[3] On one Monday evening, a last-minute cancellation by a subject resulted in three, rather than the usual four, blood draws that evening. The next week, the subject who had cancelled for the previous week appeared; there also appeared an additional subject who was not expected, resulting in six subjects that evening. For the two subjects who did not conform to the schedule that evening, blood tubes were inadvertently switched, when they should not have been. This resulted in a total of 18 subjects in the "another's blood" condition and 14 subjects in the "own blood" condition.

[4] The ANOVA was computed at SRI International by Jessica Utts.

[5] In order to identify significant scorers, a two-tailed test was used, allowing for the possibility of significant psi-missing. This was done because the Pilot study had yielded a considerable number of scores in the missing direction. If one wishes to predict only psi-hitting, a critical $t = +1.73$ ($p < .05$, one-tailed) could be used. By such a hitting-alone criterion, eight independently significant hitters may be indentified (Subject No. 26 now reaches significance). The probability of observing eight out of 32 independently significant hitters is 1.39×10^{-4} .

Table 1

Analysis of Variance Summary Table

SOURCE	df	SS	MS	F	p
Source (own vs another's)	1	.3480	.3480	.001	.981
Condition (protect vs control)	1	2.2278	2.2278	.461	.503
Subjects	30	18078.7369	602.6247	297.626	.0000
Source x Condition	1	2.6061	2.6061	.539	.469
Condition x Subjects	30	145.1072	4.8369	2.389	.000063
Error	576	1166.2668	2.0248		

Table 2

Means and Standard Deviations for the Percent Change Scores for the Various Conditions

	CONTROL	PROTECT	
OWN	X = 43.63 SD = 5.07	X = 43.36 SD = 5.10	X = 43.50 SD = 5.08
ANOTHER'S	X = 43.45 SD = 5.94	X = 43.45 SD = 5.73	X = 43.45 SD = 5.83
	X = 43.53 SD = 5.57	X = 43.41 SD = 5.46	X = 43.47 SD = 5.51

Table 3

Scoring Rates (t Tests) for Individual Subjects

Subject	t	Subject	t
1	-2.17 *	17	1.24
2	1.47	18	-0.98
3 o	0.31	19 o	2.14 *
4 o	-1.26	20 o	-0.68
5 o	-0.51	21 o	-1.04
6	1.28	22	-1.14
7	0.39	23 o	3.39 *
8	-1.15	24	0.26
9	-0.51	25 o	3.04 *
10 o	-0.25	26 o	1.96
11	-0.84	27	-1.46
12 o	2.52 *	28	-0.70
13	2.96 *	29	3.08 *
14	0.17	30 o	2.53 *
15	-2.79 *	31 o	-1.24
16 o	-1.52	32	1.10

* independently significant ($p < .05$)

o indicates "own blood" condition

Table 4

Comparison of Own vs Another's t Scores for Independently Significant Subjects

OWN	ANOTHER'S
2.52	- 2.17
2.14	2.96
3.39	- 2.79
3.04	3.08
2.53	
X = 2.72	X = 0.27
SD = 0.44	SD = 2.76

19 June 1987

Dr. William Braud
Mind Science Foundation
8301 Broadway
Suite 100
San Antonio, TX 78209

Dear William:

We have run the control data you provided through the IDS Monte Carlo program. Without belaboring the details of that analysis, we can summarize the outcome in three categories: Assumptions, Conclusions and Proposed Protocol.

Assumptions:

1) Each subject contributes only one experimental visit; 32 subjects planned in all; 16 in each condition (own vs other).

2) At least twenty samples can be utilized from each blood draw, although no more than 10 can be processed in any experimental period.

3) We can normalize change scores across subjects (see below) in order to sum data and reduce error bars. We are planning to sum all 32 subjects for the the IDS vs RA test.

Conclusions:

1) The experiment should have an independent measure that psi occurred (e.g. your planned ANOVA).

2) We should be able to distinguish IDS from MCE (at the 0.02 level) for an IDS strength parameter of 0.5 (an observed standard deviation in the experimental Z-scores, as compared to the control data, of 1.5 instead of 1.0). For comparison, the RNG data-IDS strength parameter is about 0.4.

3) We should be able to distinguish IDS from RA for a mean shift of about 0.3 σ. The exact value will depend on the error bars of the data. Control data you sent us comparing 50% and 50.5% saline shows a mean shift of about this value (0.2 - 0.3 σ).

SRI International
333 Ravenswood Ave. • Menlo Park, CA 94025 • (415) 326-6200 • TWX: 910-373-2046 • Telex: 334 486 • Facsimile: (415) 326-5512

Proposed Protocol:

1) Four trial periods for each subject visit, consisting of two effort and two control, intermixed on a counterbalanced basis. W.B. blind to type of trial period during measurements.

2) Two control periods identical in time, but consisting of 2 and 8 tubes respectively. Subject blind to the number of tubes.

2) Two effort periods identical in time, but consisting of 2 and 8 tubes respectively. Subject blind to the number of tubes.

3) Each measurement to be entered and normalized as indicated on the attached data sheets.

I have included the Monte Carlo and theoretical calculations, as well as the "design sheets" Ed has constructed for generalized applications. Rather than writing a long-winded explanation, it would be best to discuss these details over the phone.

In parallel with getting your confirmation experiment going, we need to submit the protocol to our SOC. When we have confirmed the details by phone, please send me a printed version of the handwritten protocol you gave me at the SSE meeting.

Thanks and Good Luck – will be speaking to you soon.

Best Regards,

G. Scott Hubbard
Sr. Research Physicist
Geoscience and Engineering Center

cc: Ed May

MIND SCIENCE FOUNDATION
BLOOD HEMOLYSIS EXPERIMENT
EFFORT GROUP

TUBE NUMBER	% CHANGE (Y)	NORMALIZED VALUE (E)
Tube 1	$Y_1 =$	$E_1 =$
Tube 2	$Y_2 =$	$E_2 =$
Tube 3	$Y_3 =$	$E_3 =$
Tube 4	$Y_4 =$	$E_4 =$
Tube 5	$Y_5 =$	$E_5 =$
Tube 6	$Y_6 =$	$E_6 =$
Tube 7	$Y_7 =$	$E_7 =$
Tube 8	$Y_8 =$	$E_8 =$
Tube 9	$Y_9 =$	$E_9 =$
Tube 10	$Y_{10} =$	$E_{10} =$

$\mu_Y =$ _____

$\sigma_Y =$ _____

$$E = \frac{Y - \mu_Y}{\sigma_Y}$$

MIND SCIENCE FOUNDATION
BLOOD HEMOLYSIS EXPERIMENT
CONTROL GROUP

TUBE NUMBER	% CHANGE (X)	NORMALIZED VALUE (C)
Tube 1	X_1 =	C_1 =
Tube 2	X_2 =	C_2 =
Tube 3	X_3 =	C_3 =
Tube 4	X_4 =	C_4 =
Tube 5	X_5 =	C_5 =
Tube 6	X_6 =	C_6 =
Tube 7	X_7 =	C_7 =
Tube 8	X_8 =	C_8 =
Tube 9	X_9 =	C_9 =
Tube 10	X_{10} =	C_{10} =

μ_X = _____

σ_X = _____

$$C = \frac{X - \mu_X}{\sigma_X}$$

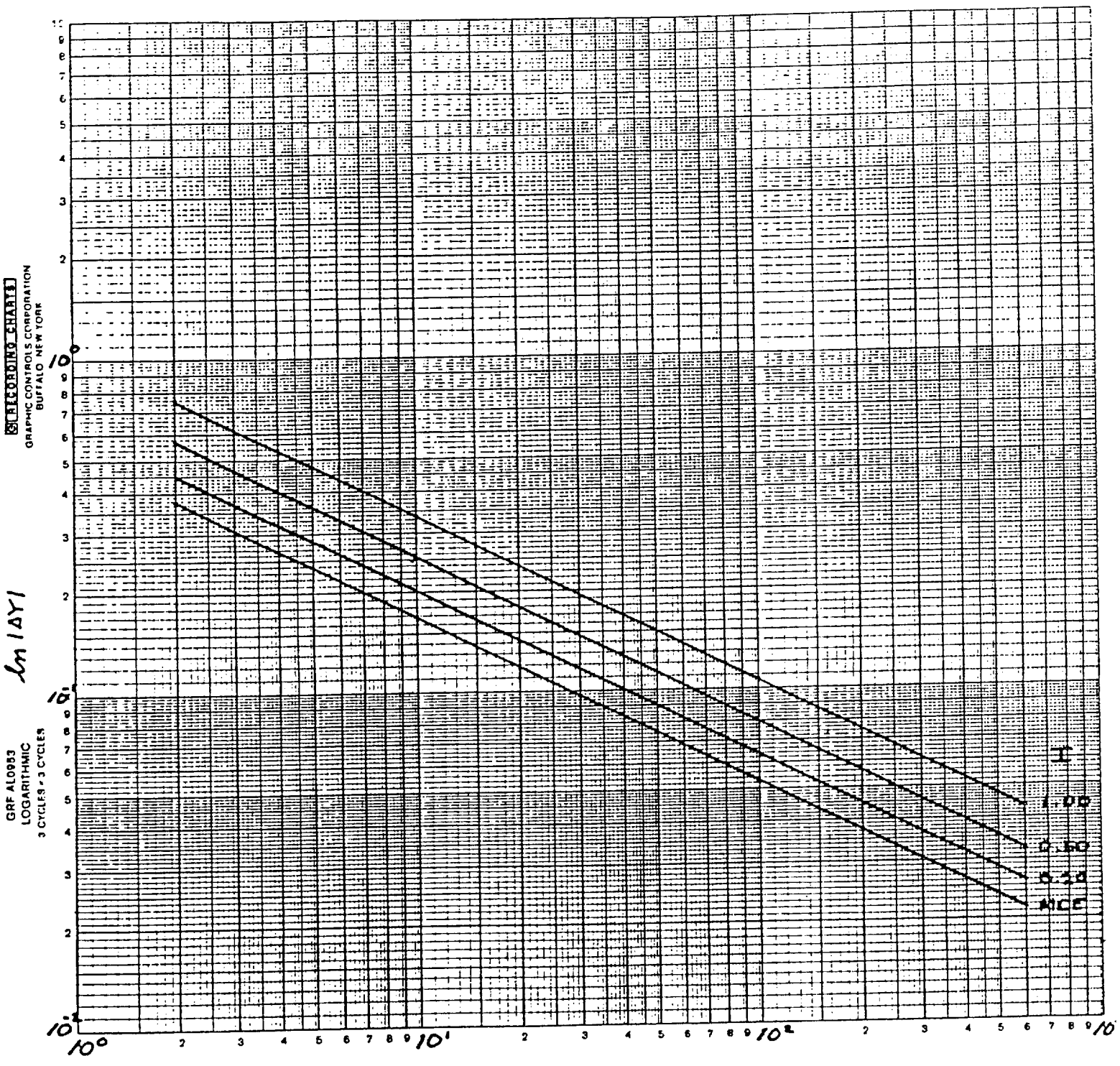


FIGURE SELECTION PREDICTIONS of THE IDS MODEL

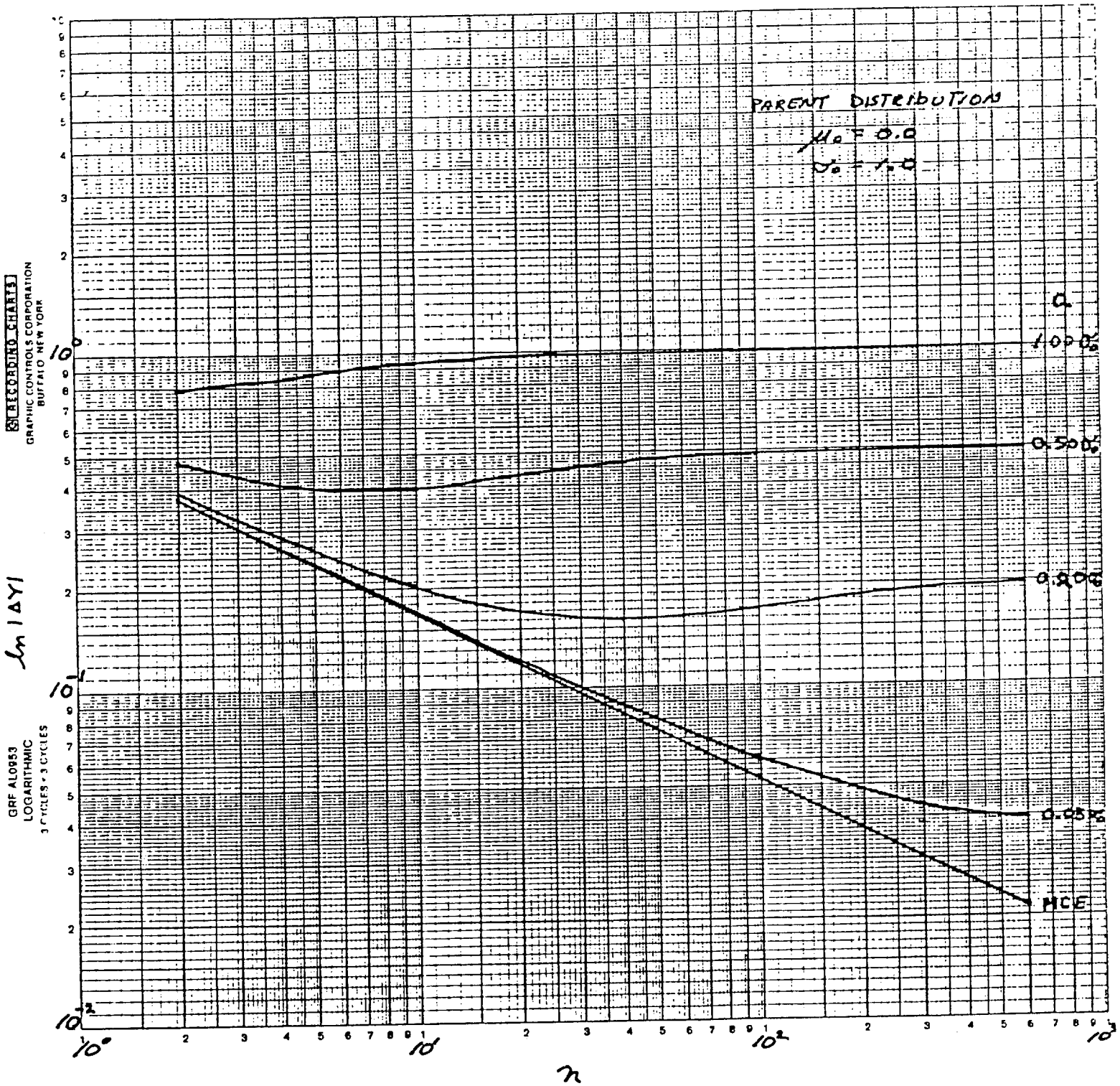


FIGURE REMOTE ACTION PREDICTIONS of THE IDS MODEL

Approved For Release 2000/08/10 : CIA-RDP96-00787R000300090001-1

Data File *** MONTI.ids Analyzed Fri Jun 19 13:00:47 1987

Sequence Order : 2 8

32 TRIALS at
$n = 2$ AND
$n = 8$
$I = 0.5$
(MONTE CARLO SIMULATION)

Overall Trials = 64
Overall Z-mean = -0.3030
Overall Z-variance = 1.7196
Overall Z-max = 3.8297
Overall Z-min = -3.1769
Overall Chi-sqr = 108.3333 (df = 63)
Overall z(Chi) = 3.5393
Overall p-value = 0.000201 (1-tailed)

Linear Corr. Coef. = -0.1549 (df = 62)

LINEAR LEAST SQUARES FIT TO THE DATA

y = a+b(x-xbar): a = -0.9993 +/- 0.1386
b = -0.2468 +/- 1.5866

MCE-LINE: a = -1.3283
b = -0.5000

ybar = -0.9993
xbar = 1.3863

MCE-LINE (n,delta_p): (2 , 3.75e-01)
: (4 , 2.65e-01)
: (8 , 1.87e-01)

DATA-LINE (n,delta_p): (2 , 4.37e-01)
: (4 , 3.68e-01)
: (8 , 3.10e-01)

SLOPE AND INTERCEPT TEST

Slope (-.5000): F = 1.6298 (df1 = 1; df2 = 62)
Slope : p = 0.2065

Intcp (-1.328): F = 5.6402 (df1 = 1; df2 = 62)
Intcp : p = 0.02066

JOINT SLOPE AND INTERCEPT TEST

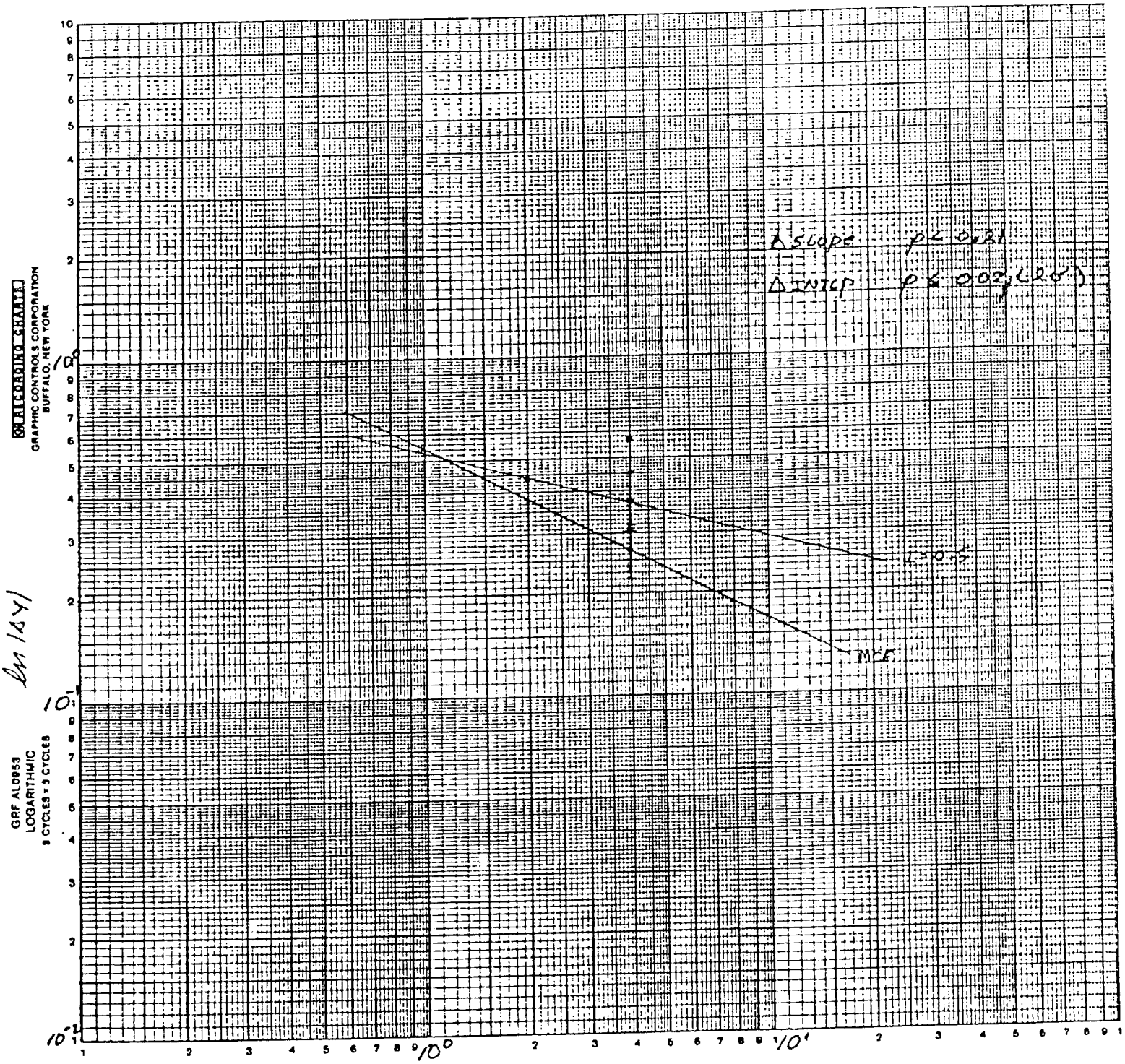
Joint : F = 3.6223 (df1 = 2; df2 = 62)
Joint : p = 0.03252

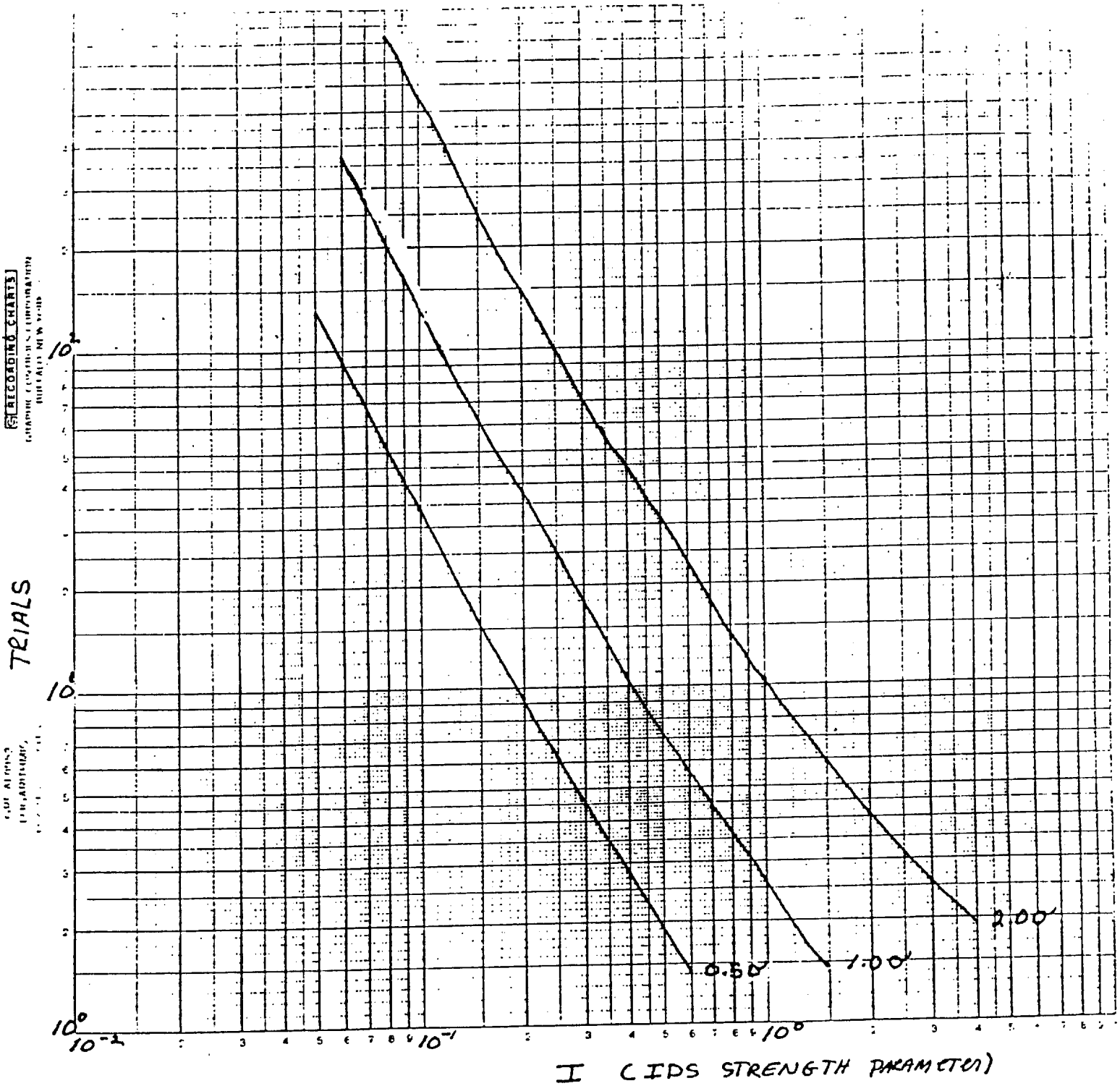
TOTAL Z-SCORE DISTRIBUTIONS

Z-Cent	Total	2	8
-3.3	1	0	1
-3.0	0	0	0
-2.7	1	0	1
-2.4	0	0	0
-2.1	4	1	3
-1.8	3	1	2
-1.5	4	2	2
-1.2	8	5	3
-0.9	8	3	5
-0.6	3	2	1
-0.3	5	5	0
0.0	6	4	2
0.3	4	1	3
0.6	2	1	1
0.9	6	3	3
1.2	3	1	2
1.5	1	1	0
1.8	2	0	2
2.1	1	1	0
2.4	1	1	0
2.7	0	0	0
3.0	0	0	0
3.3	1	0	1

Z-SCORE by SEQUENCE LENGTH

SQ_L	Trials	Mean	Var	Max	Min	Chi**2	Z_Chi	p_value
2	32	-0.208	1.225	2.464	-2.078	37.980	0.905	0.1827
8	32	-0.398	2.251	3.830	-3.177	69.778	4.003	3.127e-05





ESTIMATED SIGNIFICANCE LEVELS FOR TRIALS VS. IDS STRENGTH PARAMETER

MONTI CARLO RAW data

32 TRIALS at
TWO Sequence lengths
I = 0.5

```
2 1.000000
   2.0    8.0
        2   0.04782   -0.0676
        2   0.99439   -1.4063
        2   0.76937   -1.0881
        2   0.90805   -1.2842
        2   1.46957   -2.0783
        2   0.93610   -1.3238
        2   1.19693   -1.6927
        2   0.16107   -0.2278
        2   0.36642    0.5182
        2   0.70443    0.9962
        2   0.59823    0.8460
        2   1.74219    2.4638
        2   0.78434    1.1092
        2   0.16503   -0.2334
        2   0.09396    0.1329
        2   0.26589    0.3760
        2   0.33151   -0.4688
        2   0.68412    0.9675
        2   1.58424    2.2404
        2   0.49322   -0.6975
        2   0.06396    0.0905
        2   0.60705   -0.8585
        2   0.66750   -0.9440
        2   0.75755   -1.0713
        2   0.83861   -1.1860
        2   0.57736   -0.8165
        2   0.11964   -0.1692
        2   0.13851   -0.1959
        2   0.10115   -0.1430
        2   1.14132   -1.6141
        2   0.95538    1.3511
        2   0.13104   -0.1853
        8   0.73697   -2.0845
        8   1.35400    3.8297
        8   0.39047   -1.1044
        8   0.14406    0.4075
        8   0.28278    0.7998
        8   0.38133    1.0786
        8   0.67739    1.9159
        8   0.36532   -1.0333
        8   0.71252   -2.0153
        8   0.27552   -0.7793
        8   0.74209   -2.0990
        8   1.12322   -3.1769
        8   0.10238    0.2896
        8   0.28142    0.7960
        8   0.59737    1.6896
        8   0.38356   -1.0849
        8   0.03636    0.1028
        8   0.40915    1.1573
        8   0.23196    0.6561
        8   0.60384   -1.7079
        8   0.00198    0.0056
        8   0.27758   -0.7851
        ↑       ↑         ↑
        n      ΔY         Z
```

8	0.60023	-1.6977
8	0.33072	-0.9354
8	0.06705	0.1896
8	0.45164	-1.2774
8	0.20785	-0.5879
8	0.35908	1.0156
8	0.28114	-0.7952
8	0.49283	-1.3939
8	0.49233	-1.3925
8	0.95888	-2.7121

APPLICATION FOR PARTICIPATION

In order to assure program requirements and avoid exacerbating pre-existing conditions, we ask you to provide the following confidential medical information.

NAME _____ AGE _____ HEIGHT _____ WEIGHT _____

	YES	NO
1. (Females only) I am pregnant.	___	___
2. I have received treatment (including out-patient and hospital care) for, or have a diagnosed history of, the following:		
Seizure disorder	___	___
Mental disorder	___	___
Drug or alcohol addiction	___	___
Use of amphetamines, hallucinogens, or other mind-altering drugs	___	___
Metabolic disorder	___	___
Immunological disorder	___	___
Any chronic debilitating disease	___	___
3. I am currently taking medication for:		
Seizure disorder	___	___
Mental disorder	___	___
Drug or alcohol addiction	___	___
Use of amphetamines, hallucinogens, or other mind-altering drugs	___	___
Metabolic disorder	___	___
Immunological disorder	___	___
Any chronic debilitating disease	___	___

4. I have taken the following prescribed medications during the last 12 months:

_____

_____

5. I have had a serious cold, flu, sinus problem, or allergy episode within the past two weeks Yes ___ No ___

6. I consider myself to be in poor fair good excellent health (circle one)

7. I agree to notify the project director if I receive diagnoses or treatments for any of the above during my participation in proposed experiments.

I believe that the above is true and correct to the best of my knowledge. I also understand that this information is confidential and will not be disseminated beyond this project.

_____ _____

Signature Date

Name Date _____

Address _____ Time _____

_____ Phone _____

CONSENT BY THE PARTICIPANT FOR STUDY UNDER INVESTIGATION KNOWN AS

HEMOLYSIS EXPERIMENT

1. I, the undersigned participant, have been informed of the nature, duration and purpose of the study under investigation listed above, and I voluntarily consent to my participation in that study.

2. I understand that

   A. A small (10 ml) venous blood sample will be drawn from my arm by a registered nurse. I will return to the lab this week for a session (about 1 hr.) during which I will attempt to exert a distant mental influence upon my own or another person's red blood cells, using visualization techniques. Confidentiality of records will be maintained.

   B. The risks and discomforts which may be associated with the above study are Slight discomfort associated with the drawing of blood. I understand that obtaining venous blood is a routine procedure, carried out daily in physicians' offices and hospitals. I was told that it is not a life-threatening procedure and yet there is no absolute guarantee of safety on this or other procedures. Individual sterile needles will be used only once then discarded, to eliminate infection.

   C. While no assurance or guarantee can be or has been made or given as to the benefits of this study or procedure, there is a reasonable expectation of the following benefits to me in taking part in this study: The study has implications for a possible role of psychic functioning in self-healing. I will learn about psychoneuroimmunology and about psychokinesis, and about my own abilities to perform the latter under controlled laboratory conditions.

   D. I agree to inform the investigator(s) of any deviation(s) from the established procedures of this experiment.

   E. I am free to withdraw consent and to discontinue participation in this study at any time for any reason.

SIGNED X _____ (Participant)

WITNESS _____

_____

INVESTIGATOR'S STATEMENT

In addition to advising the participant of the study, I have offered an opportunity for further explanation and answering questions relating to it.

SIGNED _____ (Investigator)

8301 Broadway Suite 100 San Antonio, TX 78209 821-6094

INSTRUCTIONS TO PARTICIPANT

If human red blood cells are maintained in fluids having a salinity (salt content) similar to that of the blood plasma, the cells survive intact for long periods. However, if placed in a fluid having a salinity which is lower than that of the plasma (e.g., very dilute saline or distilled water), the corpuscles swell due to the movement of water through their semi-permeable membranes. Eventually they rupture and release their contents (hemoglobin) into the surrounding medium. The process by which the red blood cells die in this manner is called "hemolysis." Hemolyis can be measured by passing a beam of light through a test tube containing a suspension of red blood cells. If the cells are healthy and intact, they are opaque to light and very little light passes through the tube. If the cells are injured, however, they become more transparent to light and much more light passes through the tube. The intensity of the light can be measured by means of a device called a spectrophotometer. The spectrophotometer is connected to a computer which provides a permanent record of the change in light intensity over a period of time (i.e., the time course of hemolysis).

In this experiment, we are studying the degree to which persons can protect red blood cells (i.e., slow down the rate of hemolysis), mentally and at a distance. We will measure the rate of hemolysis of blood cells in several test tubes. Some of the tubes will be CONTROL tubes which you will not attempt to influence; these control tubes will provide baseline measures of how hemolysis normally proceeds. Other tubes will be PROTECT tubes. You will attempt to **protect** the red blood cells in the **PROTECT** tubes and **slow down** the rate of hemolysis of those cells. For the PROTECT tubes, here are some mental strategies you can use:

- firmly and confidently intend for the red blood cells to be protected and hemolysis retarded;
- confidently believe that the desired outcome will occur;
- vividly image or visualize any one or any combination of the following:
    * the red blood cell membranes intact and healthy
    * the red blood cells normally thin, disk-shaped, and perfectly healthy
    * little or no water flowing through the membranes and into the cells
    * very little light passing through the test tube containing the red blood cells
    * computer printouts of very low percent light transmittance numbers
- gently wish for a successful outcome for each tube

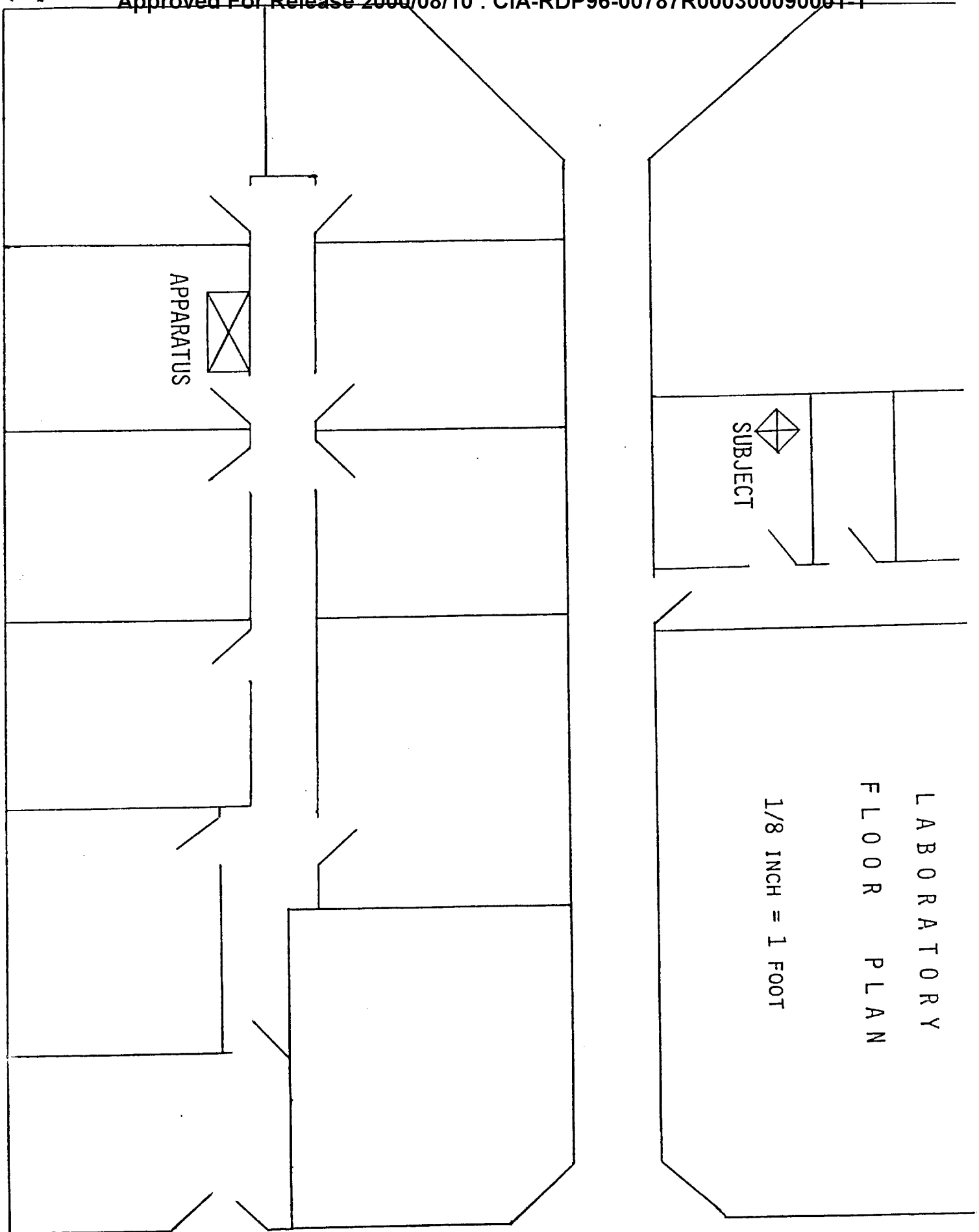
The sealed envelope contains the proper sequence for the CONTROL and the PROTECT periods. When you notice the envelope being slipped under the door, retrieve the envelope and open it. The sheet of paper inside of the envelope will indicate what you are to do during each of the four periods of the experiment. Each period will last approximately fifteen minutes. There will be two CONTROL periods and two PROTECT periods; you will find these given in a random order on your sheet of paper. Keep the paper handy so you can refer to it at the proper times. Next, put on the headphones. Soon, you will hear instructions and relaxation exercises through the headphones. Simply follow the instructions. Beeping sounds will signal the beginning of each period. Period 1 will be signalled by one beep, Period 2 by two beeps, and so on. When you hear the first beep, consult your sheet and follow that instruction (either CONTROL or PROTECT) throughout the fifteen-minute period until you hear the next beeps, which signal the beginning of the next period. Follow the appropriate instructions until all four periods have been completed.

During the two fifteen-minute PROTECT periods, visualize and intend for the red blood cells being measured during those periods to be protected from hemolysis, to experience very slow rates of hemolysis. Think about and visualize this intended outcome throughout the periods. Continue to relax and flow with the music and look at the color slide of healthy cells during those two PROTECT periods. Use one or more of the mental strategies given on Page 1.

During the two fifteen-minute CONTROL periods, keep your mind off of the blood cells and think about other things. If you do think of the experiment, imagine and intend for hemolysis to proceed at its normal rapid rate during those two CONTROL periods. Do not look at the color slide during CONTROL periods.

Remain relaxed, yet attentive and alert throughout the experiment. Someone will notify you when the experiment is over, and will accompany you back to the equipment room. There, you will meet with the experimenter and discuss the results of the experiment.

Enjoy the experiment . . . and GOOD LUCK !



Narration for HEMOLYSIS INDUCTION TAPE

Begin by relaxing your body, and quieting your mind. Establish a mental connection with the blood cells in the spectrophotometer in the other room, as you take several deep breaths. With each inhalation and exhalation, let yourself relax more and more deeply, and let the connection between you and the blood cells increase. Give yourself a strong and confident suggestion, right now, in the form of a gentle wish and a firm expectation, that this session will have a very successful outcome. Give yourself permission to influence the blood cells in the desired way.

Let go of all tension...let all tension and strain melt away. Your ability to influence the blood cells will increase, as you relax more and more deeply...more completely.

Slightly tense the muscles of your feet and legs...hold that tension...now relax completely. Let all tension flow out of your legs and feet, and into the air around you. Let your lower body relax completely.

Tense the muscles of your buttocks, hips, abdomen and stomach...hold the tension...now relax. Let all tension leave the center of your body. Relax all of your muscles...deeply...comfortably.

Now, tense the muscles of your arms, hands and fingers...hold the tension...relax. Let all tension and strain flow out through your fingers...into the air surrounding you. Take in a deep breath...and as you exhale, feel all tension leaving you. Relax more and more deeply.

Slightly tense the muscles of your shoulders, neck and upper back...hold the tension...now relax. Let go of the tension and strain. Let it melt away. Let go of all burdens. Let your shoulders slump effortlessly. Sink into the chair. Feel the gentle pressure of the chair. Feel the light pressure of your clothing. Let all of your muscles relax completely.

Slightly tense the muscles of your jaw, face, and scalp...hold the tension...now release it. Replace it with relaxation. Thoroughly relax your jaw...relax your mouth...your tongue...relax all of your facial muscles...relax your eyes...smooth out and relax the muscles of your scalp. Relax all of the muscles of your head...deeply...comfortably.

You're deeply and pleasantly relaxed. Your relaxation will continue and will deepen throughout the experiment. Your mind is also relaxed...tranquil...peaceful...free from all distractions...free of concerns. In this relaxed state, you can image and visualize more easily and more effectively. Continue to relax as you increase the connection between you and the blood cells in the spectrophotometer in the other room.

During the PROTECT periods, you will effortlessly and effectively visualize the red blood cells...image them, visualize them being protected...see them maintaining their thin disk shape...visualize them

protected from the inflow of water...their membranes firm, healthy, intact...see very little water flowing into the cells...see them opaque...see very little red light going through the test tube...see the graph at a low level...visualize low numbers. Protect the cells from hemolysis during the PROTECT periods.

During the CONTROL periods, keep your mind off of the blood cells...allow hemolysis to proceed at its normal, rapid rate. Think about other things during the control periods.

Let your mind flow effortless with the music. You are relaxed, yet alert and attentive. You have superb control of your mind. Beeping sounds will signal each of the four periods...one beep for the first period, two beeps for the second, and so on. When you hear beeps, consult your sheet for what to do during that period...follow that instruction throughout that period until you hear the next beeps. Then follow the next instruction, and so on. Each period will last about fifteen minutes.

Your relaxed state...and the music...and the color slide will help you to visualize healthy blood cells. REMEMBER: Look at the slide and image the cells only during the PROTECT periods.

Continue to relax...and influence the blood cells in the test tube when appropriate.

for PARTICIPANT # _____

Here is the sequence for your four periods:

1st Period = _____ check when completed _____

2nd Period = _____ check when completed _____

3rd Period = _____ check when completed _____

4th Period = _____ check when completed _____

REMINDER: Beeps will signal the beginning of each of the four periods...one beep for Period 1, two beeps for Period 2, three beeps for Period 3, four beeps for Period 4.

**** IF THE PERIOD IS A P R O T E C T PERIOD, PROTECT THE BLOOD CELLS THROUGHOUT THE PERIOD.

**** IF THE PERIOD IS A C O N T R O L PERIOD, THINK ABOUT OTHER THINGS THROUGHOUT THE PERIOD.

Please sign and date this sheet (below) and give it to the person who will come to this room at the end of the experiment and tell you the session is over.

NAME _____ DATE _____

---

for the EXPERIMENTER

Here is the tube schedule for SUBJECT # _____:

1st Period = _____ tubes

2nd Period = _____ tubes

3rd Period = _____ tubes

4th Period = _____ tubes

Initials _____ Date _____